

**UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF TEXAS
HOUSTON DIVISION**

PEI-HRENG HOR,

Plaintiff,

v.

CHING-WU “PAUL” CHU,

Defendant.

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CIVIL ACTION NO. 4:08-cv-3584

MEMORANDUM AND ORDER

Plaintiff Pei-Hreng Hor and Defendant Ching-Wu “Paul” Chu have separately petitioned the Court to amend its Findings of Fact and Conclusions of Law (Doc. No. 206). For the reasons stated below, the Court **GRANTS IN PART** Dr. Hor’s Motion to Amend (Doc. No. 211) and **GRANTS** Dr. Chu’s Motion to Amend (Doc. No. 212). The amendments do not affect the final judgment issued in Dr. Chu’s favor.

I. BACKGROUND

This case seeks to resolve the inventorship of two patents, U.S. Patent No. 7,056,866 (the “866 Patent”) and U.S. Patent No. 7,709,418 (the “418 Patent”). The patents, which issued in 2006 and 2010 respectively, arose from work conducted in the High Pressure Low Temperature (“HPLT”) laboratory at the University of Houston in late 1986 and early 1987. Dr. Chu is named as the sole inventor on the patents; Dr. Hor believes he should be listed as co-inventor.

The Court’s Memorandum and Order Entering Findings of Fact and Conclusions of Law (the “Order”) set forth the hopelessly conflicting accounts of the Inventorship Period offered by Dr. Hor; by Dr Chu; and by Intervenor Ruling Meng, another member of the HPLT laboratory who—like Dr. Hor—believes she should be listed as co-inventor on the relevant patents. (Doc.

No. 206 (“FF CL”), at 4-29.) The Court will not replicate the accounts here. Ultimately, the Court—faced with irreconcilable testimony, no obvious prevarication, and scant corroborating evidence—concluded that neither Dr. Hor nor Ms. Meng had met their respective burdens of proof. (*Id.* at 34-38.) Judgment was issued in favor of Dr. Chu. (*Id.* at 38; Doc. No. 207.)

II. LEGAL STANDARD

Dr. Hor and Dr. Chu seek amendment of the Court’s Order pursuant to Federal Rule of Civil Procedure 52(b). The purpose of Rule 52(b) is, generally, to correct manifest errors of law or fact. *See Fontenot v. Mesa Petroleum Co.*, 791 F.2d 1207, 1219 (5th Cir. 1986). “This is not to say, however, that a motion to amend should be employed to introduce evidence that was available at trial but was not proffered, to relitigate old issues, to advance new theories, or to secure a rehearing on the merits.” *Id.* Unless a Rule 52(b) motion to amend is based on newly discovered evidence, the moving party must show that the Court’s findings of fact or conclusions of law are not supported by evidence in the record. *See id.*

III. ANALYSIS

Dr. Hor seeks to amend seven of the Court’s findings, and requests twenty-two additional findings, for a total of twenty-nine proposed amendments. Dr. Chu offers considerably fewer amendments: seven identified in his motion, and one included in his opposition to Dr. Hor’s motion, for a total of eight proposed amendments.

Two of the parties’ proposed amendments are typographical in nature and, ostensibly, unopposed. As denominated in the table at the end of this section, the unopposed amendments are: Hor #7 and Chu #1. Although the unopposed amendments do not affect the outcome of the lawsuit, the Court is appreciative of the guidance and will make the corrections noted.

Most of the proposed amendments, however, are subject to some amount of disagreement. The disagreement is not new. These are factual disputes the Court experienced at trial, and attempted to resolve in its 38-page Order. Ultimately, in that order, the Court determined that a majority of the specific points of controversy in the case—who did what, at what time, in what order, and why—admit no clear resolution. And in the context of a legal claim where the plaintiff, and only one the plaintiff, bears the burden of proof, the lack of clarity compels judgment in favor of the defendant. No proposed amendment, offered by either Dr. Hor or Dr. Chu, disturbs this foundational premise.

Given the Court’s ultimate conclusion, the bulk of the Order was nothing more than the Court’s best attempt to faithfully portray the parties’ contentions and arguments regarding how events unfolded during the Inventorship Period. To the extent that the Court *inaccurately* portrayed those contentions and arguments, it is amenable to amending the Order, although such a change will not produce a different outcome. The Court will not amend the Order, however, to include details, characterizations, or context that it did not then and does not now find compelling for purposes of deciding inventorship.

The Court’s ruling as to each proposed amendment is announced in the table below, with brief explanation where appropriate:

<i>No.</i>	<i>Description</i>	<i>Ruling</i>
Hor #1	Amending the finding on page 4 that Dr. Chu “was, during the relevant period, the group leader and Principal Investigator of the physics research group.”	GRANTED. The Court does not find the parties’ titles to be probative of inventorship. Nonetheless, the Court will delete the phrase “during the relevant period” from the sentence at issue, to make clear that the Court is describing the background to the Inventorship Period.

<i>No.</i>	<i>Description</i>	<i>Ruling</i>
Hor #2	On page 5, expanding on what Dr. Hor meant when he described Dr. Chu as a “father figure.”	DENIED. Dr. Hor’s proposed amendment sheds no light on the events of the Inventorship Period and is superfluous.
Hor #3	Amending the finding on page 6 that Dr. Chu asked that Dr. Hor be appointed Alternate Principal Investigator (“API”) in October 1986.	DENIED. The finding at issue accurately describes Plaintiff Trial Exhibit 100.
Hor #4	Amending the finding on page 6 that Dr. Hor accepted the API position in December 1986.	DENIED. The finding at issue accurately describes Plaintiff Trial Exhibit 101.
Hor #5	Amending the finding on page 6 that Dr. Hor, by virtue of his position as API, was in charge of the “financial and administrative aspects of the lab,” while Dr. Chu remained the leader of the “scientific part.”	<p>GRANTED. As presently drafted, the Order gives a misleading impression that there is no dispute regarding the leadership of the HPLT lab during the Inventorship Period. Rather than outlining the dispute in general terms—which, as mentioned above in Hor #1, is not particularly probative of inventorship—the Court will simply delete the following sentence from page 6:</p> <p>“As API, Dr. Hor oversaw financial and administrative aspects of the lab; Dr. Chu remained the leader of ‘the scientific part.’ (Doc. No. 190 at 112-13.)”</p>
Hor #6	On page 25, amending the description of Dr. Hor’s argument regarding the inconsistency between Dr. Chu’s trial testimony and his writings on the magnetic rare earth substitutions.	<p>GRANTED. The Order does not accurately represent Dr. Hor’s argument. The Court will amend the sentence at issue as follows:</p> <p>“Dr. Hor further contends that one of Dr. Chu’s earlier writings confirms <i>several of Dr. Chu’s publications indicate</i> that the magnetic rare earth substitutions were not undertaken until after Dr. Hazen had passed along information as to the chemical formula and structure of YBCO 1-2-3. (Doc. No. 198 at 28-29.)”</p>
Hor #7	Correcting “ration” to “ratio” on page 18.	GRANTED.

<i>No.</i>	<i>Description</i>	<i>Ruling</i>
Hor #8	“Using a nominal formula is the starting point for creation of a new compound. Tr. 6:91. Each nominal formula was typically given a formula number so that it can be tracked through the synthesis and testing process. Doc. 189 at 92.”	GRANTED. The Order uses the term “nominal formula,” but does not define it or explain its purpose. For context and clarity, the following footnote will added on page 7: “A nominal formula is the starting point for creation of a new compound. Each nominal formula was typically given a formula number so that it could be tracked through the synthesis and testing process. (Doc. No. 190 at 91-94.)”
Hor #9	“The same formula number should be used throughout the recording, synthesis and testing process. Doc. 189 at 90-92.”	DENIED. The proposed finding would be redundant to the footnote described above, in Hor #8, which already explains that a formula number permits a compound to be “tracked through the synthesis and testing process.”
Hor #10	“There are different methods to synthesize a compound from a nominal formula. It is important to record the synthesis conditions to track how a particular sample was made. Varying the synthesis conditions can change the resulting compound. Doc. 189 at 93-94.”	GRANTED. The Order relates Dr. Hor’s point that there is no synthesis information for certain compounds dating from the late February and early March 1987 period, but does not provide context for why the lack of synthesis information might be relevant. For context and clarity, the following footnote will be included on page 24: “There are different methods to synthesize a compound from a nominal formula. Varying the synthesis conditions can change the resulting compound. (Doc. 190 at 93-94.)”
Hor #11	“Physical Review Letters was the most prestigious publication at the relevant time. Publishing one or two articles as the first author in Physical Review Letters would secure a faculty position for that person. Doc. 184 at 83; Doc 187 at 82.”	DENIED. The Order already notes that the Physical Review Letters was a “prestigious” publication. (FF CL at 8.)

<i>No.</i>	<i>Description</i>	<i>Ruling</i>
Hor #12	“Ken Forster testified that Dr. Hor described the basics of chemical pressure experiments to him prior to the discovery of YBCO. Doc. 187 at 67.”	DENIED. The proposed finding is not probative of any disputed inventive contribution. Dr. Hor himself testified that “mimicking physical pressure by chemical substitution is a standard idea in our field. It’s nothing very special.” (Doc. No. 185 at 105.)
Hor #13	“It was not unusual for Meng to order rare earth oxides because of other work the lab was doing. It was standard procedure for her to keep rare earths in stock. Doc. 186 at 12-13.”	DENIED. The Order already incorporates a paraphrase of the proposed finding, in its depiction of “Plaintiff’s and Intervenor’s Version of [January 1987] Events.” (FF CL at 11.)
Hor #14	“In his other extensive writing on the subject, Dr. Chu never stated that he personally had told Dr. Hor or Dr. Wu about Yttrium substitution. Doc. 189 at 111-112.”	GRANTED IN PART. The Order already incorporates the gist of the proposed finding with regards to Dr. Wu. (FF CL at 11 fn. 10.) However, it does not expressly note the alleged inconsistencies in Dr. Chu’s stories regarding how Dr. Hor learned of the Yttrium substitution. The following sentence will be added to page 28: “In his declaration [in the Wu interference], Dr. Chu did not state that he personally told Dr. Hor of the Yttrium substitution. (<i>Id.</i>) At trial, however, Dr. Chu suggested that he had told Dr. Hor of his idea prior to January 29, 1987, but could not recall when. (Doc. No. 190 at 108-11.)”
Hor #15	“On or about January 9, 1987, Dr. Chu prepared a patent disclosure. P. Ex. 82. The disclosure did not include within its range of compositions, the YBCO sample that Dr. Wu brought to UH on January 30, 1987. Doc. 185 at 144-147.”	DENIED. Dr. Hor initially maintained that the formula for Dr. Wu’s compound was not included in the Patent Disclosure (Doc. No. 185 at 147-48), based on a misconception that the formula for Dr. Wu’s compound was formula (2) of the formulas listed on H50 (<i>id.</i> ; Doc. No. 184 at 151). When he clarified that the formula for Dr. Wu’s compound was actually formula (3), he also conceded that formula (3) <i>was</i> included in the Disclosure. (Doc. No. 185 at 154-56.)

<i>No.</i>	<i>Description</i>	<i>Ruling</i>
Hor #16	<p>“Typically, the first author in a scientific article is the person who has most significantly or directly contributed to the actual technical information that is contained in the paper. Hazen Dep. pp. 86-87; Tr. 187 at 85. Being listed as first author in the academic and scientific community indicates that person has provided the most significant contribution to the scientific discovery. Doc. 184 at 82-83 and 153; Doc. 187 at 19 and 83-85. It would be academically dishonest to list a person as first author if they had not significantly contributed to the work. Doc. 187 at 19.”</p>	<p>DENIED. The Order already notes “[t]he general custom in the field was to list first the person who had made the most significant contribution.” (FF CL at 16 n.13.) Dr. Chu testified that his practice was to list himself first in the first paper in a new field, but thereafter to list himself last in subsequent papers. (Doc. No. 190 at 75.) Another witness, Roy Weinstein, acknowledged that “some groups” follow a convention similar to the one claimed by Dr. Chu, in which senior members are listed last to “give away to the younger people.” (Doc. No. 187 at 83.) In light of these discrepancies, the Court does not find authorship order to be especially convincing evidence of inventorship. (FF CL at 37.)</p>
Hor #17	<p>“If a senior person like Dr. Chu is listed first on a scientific article it would indicate that not only is he the leader of the group, but that he made the most significant contribution to the concept. Doc. 184 at 82-83; Doc. 187 at 18-19 and 41-43.”</p>	<p>DENIED. For the reasons described above, in Hor #16, the Court does not find authorship order to be especially convincing evidence of inventorship. (FF CL at 37.)</p>
Hor #18	<p>“Dr. Hazen authored a book entitled Breakthrough: The Race for the Superconductor which details many of the events leading up to the discovery and identification of YBCO-123. P. Ex. 83. Dr. Chu agrees that it is an accurate record of the events that led to the discovery of YBCO. Doc. 189 at 132.”</p>	<p>DENIED. There is no indication that Dr. Hazen’s book helps to resolve any dispute regarding the respective inventive contributions of Dr. Hor and Dr. Chu.</p>

<i>No.</i>	<i>Description</i>	<i>Ruling</i>
Hor #19	“The HPLT Lab did not have the capability of performing x-ray diffraction analysis to identify which compounds were in a mixed phase sample in February and March of 1987. Without such analysis, the lab could not tell if gadolinium was substituted into the 123 phase. For these reasons, partial substitution of gadolinium for yttrium in the 214 phase would have been scientifically meaningless. Doc. 184 at 15, 179-182 and 217; Doc. 186 at 159-161; Doc. 189 at 145-147.”	DENIED. Hor #19 is redundant and unnecessary. The Order already notes that the HPLT Lab lacked x-ray diffraction analysis capability in the relevant time period. (FF CL at 16.) It also relates Dr. Hor’s argument that partial substitution of gadolinium for yttrium, as claimed by Dr. Chu, would be scientifically inconclusive given the lab’s inability to discern whether “some pure high T _c YBCO-123 [was] present in the newly synthesized compound.” (<i>Id.</i> at 25.)
Hor #20	“Dr. Hor was listed as the first author of the UH group for all papers submitted to and published in the Physical Review Letters related to the discovery of YBCO and the magnetic rare-earth super-conductors. Doc 189 at 121; P. Ex. 48, 60 and 86.”	DENIED. The Order already notes that Dr. Hor was listed as first author on two of the three relevant papers. ¹ (FF CL at 16, 20.) The Order also reflected that Dr. Hor relies on authorship order to support his inventorship claims. (<i>Id.</i> at 36.) In light of these passages, Hor #20 is redundant.
Hor #21	Hor #21—a proposed additional finding regarding Dr. Chu’s statements recommending Dr. Hor for tenure and the importance of honesty in the tenure process—is too lengthy to recount, but can be found in Dr. Hor’s motion to amend. (Doc. No. 211, at 5-6.)	DENIED. The first and last sentences in Hor #21 are already represented in the Order. (FF CL at 29.) The remaining sentences are not probative of inventorship.
Hor #22	“Given his demonstrated quickness in filing patent applications, it is unreasonable to infer that Dr. Chu would have waited over a month from mid-February to March 26, 1987 to file a continuation-in-part patent application that included the magnetic rare-earth super-conductors. Doc. 185 at 171-172.”	DENIED. The Order already contains this argument. (FF CL at 25.)

¹ The third paper—Plaintiff Exhibit 86—is not mentioned in the Order.

<i>No.</i>	<i>Description</i>	<i>Ruling</i>
Hor #23	Hor # 23—a proposed additional finding regarding alleged inconsistencies between Dr. Chu’s trial testimony and his writings on the magnetic rare earth superconductors—is too lengthy to recount, but can be found in Dr. Hor’s motion to amend. (Doc. No. 211, at 6-7.)	DENIED. With the slight amendment set forth above in Hor #6, all arguments contained within Hor #23 will be represented in the Order, albeit not all in one place. (FF CL at 20, 24-25.)
Hor #24	“During the period from November of 1986 through the next six months, the field of superconductivity research was a very competitive environment. Numerous labs were trying to find out what was going on at UH because there [<i>sic</i>] trailing in the development of high-temperature superconductors. Doc. 187 at 10-11.”	DENIED. The proposed finding is not probative of any disputed matter that the Court was called upon to resolve.
Hor #25	“In 1988, Dr. Hor’s salary at UH was approximately \$43,000. Doc. 185 at 49. The \$137,000 payment was almost three times the amount of his annual salary. Doc. 185 at 50.”	DENIED. The comparison of the DuPont proceeds to Dr. Hor’s salary is not probative of any disputed matter that the Court was called upon to resolve. The Order already notes the inference which Dr. Hor intends to draw from the comparison, which is “that Dr. Hor’s . . . contributions to the ‘816 and ‘418 patents were substantial.” (FF CL at 27.) Nonetheless, the Court did not find the DuPont payments “especially convincing.” (<i>Id.</i> at 37.)

<i>No.</i>	<i>Description</i>	<i>Ruling</i>
Hor #26	“Dr. Hor did not follow up with Dr. Chu because he trusted him and because in his public writings on the discovery of YBCO and the magnetic rare earth superconductors, Dr. Chu was very fair to everybody. Doc. 186 at 61-62.”	<p>GRANTED. The Court already represented Dr. Hor’s explanation that he did not follow up with Dr. Chu because he trusted him. (FF CL at 27.) The Court will amend the sentence at issue to include the remainder of Dr. Hor’s explanation:</p> <p>“In the end, however, Dr. Chu did not follow up with Mr. Cox and Dr. Hor did not discuss the matter again with Dr. Chu ‘because he trusted him <i>and because in his public writings on the discovery of YBCO and the magnetic rare earth superconductors, Dr. Chu was very fair to everybody.</i>’ (Doc. No. 198 at 33 (citing Doc. No. 186 at 61-62).)”</p>
Hor #27	“Dr. Hor’s December 4, 1990 declaration states that at the meeting ‘Ru-ling and I discussed the concept that substitution of Y for La in a composition of La-Ba-Cu-O would produce a composition of Y-Ba-Cu-O that superconducts at a higher T _c than that of a La-Ba-Cu-O composition.’ It also states that Hor and Meng ‘initiated the discussion of this concept with M.K. Wu.’ P. Ex. 5.”	DENIED. The quoted passage is not probative of any disputed matter that the Court is called upon to resolve.
Hor #28	“Dr. Hor’s statements in his declaration were consistent with his understanding that he was at least a co-inventor of YBCO-123 and that it was a group effort. Doc. 185 at 57.”	DENIED. The proposed finding is already represented in the Order. (FF CL at 28.)
Hor #29	“Dr. Hor’s December 4, 1990 declaration does not state that Dr. Chu had conceived of the idea of Yttrium substitution or that it was someone other than Dr. Hor’s idea. P. Ex. 5.”	DENIED. The proposed finding is redundant and unnecessary. The Order already represents Dr. Hor’s position that the declaration was “consistent with his understanding that he was at least a co-inventor.” (FF CL at 28.)

<i>No.</i>	<i>Description</i>	<i>Ruling</i>
Chu #1	Correcting “formal” to “formula” on page 7.	GRANTED.
Chu #2	Adding the following sentence to page 9: “With respect to the Strontium substitution in December 1986, neither Dr. Hor nor Ms. Meng dispute that it was Dr. Chu who conceived of replacing Barium with Strontium. (Doc. No. 185, at 104-05, 129-30, 221-22.)”	GRANTED. Dr. Chu correctly notes that this point is not disputed. (Doc. No. 184 at 129; Doc. No. 185 at 101, 104-05; Doc. No. 186 at 91, 93-94, 107.) The Court will include it in the Order to more accurately capture the events of December 1986.
Chu #3	Correcting “Dr. Hor” to “Dr. Wu” in the following sentence on page 12: “By substituting Yttrium for Lanthanum, Dr. Hor was able to create a YBCO compound that exhibited superconductivity above 77 K.”	GRANTED. This is an error in the Order. All parties acknowledge that Dr. Wu performed the initial substitution of Yttrium for Lanthanum. (Doc. No. 184 at 141, 150-52; Doc. No. 186 at 15-16; Doc. No. 192 at 48-49.)
Chu #4	Altering this sentence on page 12 to delete the reference to Dr. Hor: “Dr. Hor asked Ms. Meng to record formulas for conducting the Yttrium substitution, which she did on or around January 13. (Pl. Trial Ex. 8.)”	GRANTED. The Court has reviewed the trial record and agrees that there is no evidence that Dr. Hor asked Ms. Meng to record formulas in mid-January 1987. The sentence will be revised as follows: “Ms. Meng recorded formulas for conducting the Yttrium substitution on or around January 13. (Pl. Trial Ex. 8.)”
Chu #5	Adding a footnote to page 16 regarding Dr. Chu’s purported naming convention for scientific papers.	GRANTED. Although the Court did not find “authorship order” to be “especially convincing” evidence of inventorship (FF CL at 37), it will amend the Order to reflect Dr. Chu’s explanation of why he was listed last on certain scientific papers in the record. The following sentence will be added to footnote 13: “Dr. Chu testified that his custom was to name himself first in the first paper in a new field, but thereafter to list himself last in subsequent papers. (Doc. No. 190 at 75.)”

<i>No.</i>	<i>Description</i>	<i>Ruling</i>
Chu #6	Adding a footnote to page 24 regarding Dr. Chu's purported reason for continuing to use the 2-1-4 formula after the structure of YBCO-123 had been identified.	<p>GRANTED. The Order includes Dr. Hor's argument that there was no reason to use the 2-1-4 formula after the structure of YBCO-123 had been identified, but omits Dr. Chu's response. The following footnote will be added on page 24:</p> <p>"Dr. Chu testified that he continued to use the 2-1-4 formula in this time period because the lab did not know how to make YBCO-123 yet. (Doc. No. 192 at 141-42.)"</p>
Chu #7	On page 26, including the reason that Mr. Cox did not seriously entertain Dr. Chu's suggestion that Dr. Hor and Ms. Meng be named co-inventors on the '866 patent.	<p>GRANTED. To better depict Mr. Cox's testimony on the matter, the Court will replace the last sentence on page 26 with the following sentence:</p> <p>"Mr. Cox testified that he did not interpret Dr. Chu's question as a serious suggestion that Dr. Hor and Ms. Meng were co-inventors. (Doc. No. 186, at 228-33.)"</p>
Chu #8	In his opposition to Hor # 15, Dr. Chu requests that the finding on page 14 that "the formula described in [Dr. Chu's January 9, 1987] Patent Disclosure matches the one Wu brought to UH much later, on January 30" be amended to attribute the testimony to Dr. Hor, not Dr. Chu. (Doc. No. 214 at 13.)	<p>GRANTED. The Order mistakenly attributes the relevant testimony to Dr. Chu. The sentence will be amended as follows:</p> <p>"Dr. Chu notes <i>Dr. Hor admits</i> that the formula described in the Patent Disclosure matches the one Wu brought to UH much later, on January 30. (Doc. No. 184 at 150-51; Doc. No. 185 at 155-56.)"</p>

IV. CONCLUSION

None of the proposed amendments or additional findings changes the Court's ultimate conclusion that Dr. Hor failed to meet his burden of proving inventorship by clear and convincing evidence. Nonetheless, for the reasons stated, the Court **GRANTS IN PART** Dr. Hor's Motion to Amend (Doc. No. 211) and **GRANTS** Dr. Chu's Motion to Amend (Doc. No. 212). The Court will issue an Amended Memorandum and Order Entering Findings of Fact and Conclusions of Law containing the changes noted above.

IT IS SO ORDERED.

SIGNED at Houston, Texas, on this the twenty-first day of January, 2015.

A handwritten signature in dark ink, appearing to read "Keith P. Ellison", written in a cursive style.

KEITH P. ELLISON
UNITED STATES DISTRICT JUDGE